

**1 YEAR**  
WARRANTY

# **Ω OMEGA®** **User's Guide**

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## **CDH-280-KIT** **Conductivity Meter**



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# TABLE OF CONTENTS

## CDH-280-KIT

<b>SECTION</b>	<b>DESCRIPTION</b>	<b>PAGE</b>
1	Introduction	1
	Description	1
	Unpacking	1
	Installing the battery	2
	Instrument test procedure	3
2	Calibration and Measurement	4
3	Troubleshooting	5
4	Accessories	6
5	Specifications	7
-	Appendix 1: Cell Constants	8
-	Appendix 2: Calibration Solutions	9

# SECTION 1

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## Introduction

### Description

The OMEGA® CDH-280-Kit Conductivity Meter is a simple-to-use, portable, battery-operated instrument. The meter allows automatically temperature-compensated conductivity measurements over a wide range.

### Unpacking

Remove the Packing List and verify that you have received all equipment. If you have any questions about the shipment, please call the OMEGA Customer Service Department at 1-800-622-2378 or (203) 359-1660.

When you receive the shipment, inspect the container and equipment for any signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

#### *Note*

The carrier will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing material in the event that re-shipment is necessary.

The following items are packed in the box:

- CDH-280 Conductivity Meter
- Conductivity cell,  $K=1/\text{cm}$
- Carrying case
- 9V Battery
- Operator's Manual

# Setting Up

## Battery Replacement

REFER TO FIGURE 1

- The instrument is supplied with a 9V battery.
- The battery will afford the user approximately 35 hours of continuous use. When the battery needs changing, the word BAT will appear on the display.
- To install or replace the battery slide the back cover off.
- Remove the old battery and insert a new one making sure that the polarity orientation is correct.
- Replace back cover.

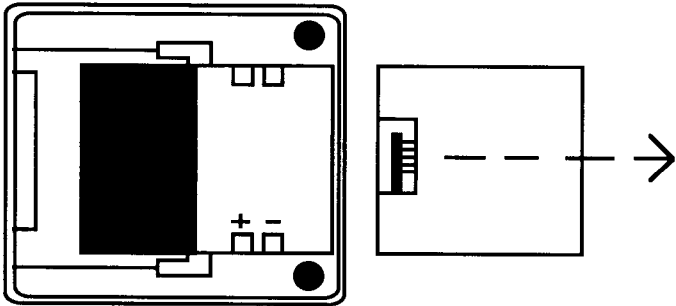


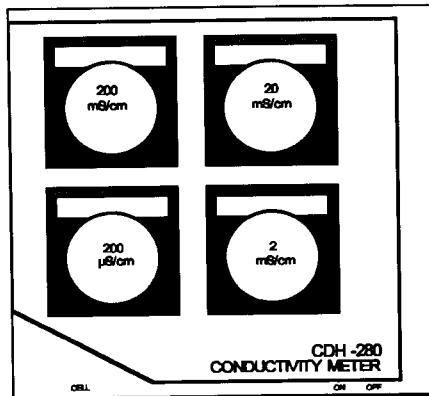
Figure 1. Battery Installation

## Instrument Test Procedure

REFER TO FIGURE 2

- Switch the instrument on using the ON/OFF switch.
- Connect the calibration plug to the cell socket on the front of the meter.
- Select the 2mS/cm range.
- Adjust the Cal control by inserting a screwdriver into the small hole on the right-hand side of the instrument. Turn the adjustment screw backwards or forwards until the display reads 1.000mS/cm and remains stable.
- Select 20mS/cm range      Display should read 1.00  
Select 200mS/cm range      Display should read 1.0  
Select 200 $\mu$ S/cm range      Over-range condition indicated by the figure '1' in the left digit of the display.
- The meter is now ready for calibration.

Figure 2.  
The Front Panel



### *A NOTE ON CONDUCTIVITY CELLS*

#### **Platinum Plate Cells.**

This type of cell uses two platinum cell plates, coated with a platinum oxide layer. It is important not to touch the surface of the plates while in use or when cleaning, as any surface damage could result in the linearity of the cell being affected. For this reason, these cells are not suitable for samples containing suspended solids.

#### **Epoxy, Carbon Plate Cells**

This type of cell has carbon cell plates in an epoxy housing. Its rugged construction makes it not only suitable for industrial and field applications but also easy to clean.

# SECTION 2

## Calibration and Measurement

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For accurate results always rinse the cell in de-ionized water and blot dry when transferring from one solution to another to prevent contamination. Use a calibration solution with a conductivity as close to that of the sample as possible.

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REFER TO FIGURE 2

- ➊ Connect the cell to the meter and switch on using the ON/OFF switch.
- ➋ Select the range that is most appropriate for the calibration solution in use. e.g. for 0.01M KCl, which has a conductivity of  $1413\mu\text{S}/\text{cm}$  ( $1.413\text{mS}/\text{cm}$ ) at  $25^\circ\text{C}$ , select the  $2\text{mS}/\text{cm}$  range.
- ➌ Place the cell in the calibration solution and wait for the reading to stabilize. (Gentle stirring may be necessary to permit any trapped air in the probe to escape).
- ➍ When the reading is stable, adjust the value to that of the standard using a screwdriver to turn the calibration screw on the side of the meter.
- ➎ Transfer the cell to the sample and record the stabilized reading.

# SECTION 3

## Troubleshooting

### Symptom

**No Display**

**“BAT” flag displayed**

**Display reads zero**

**Display shows '1' in left hand digit**

**(Over-range condition)**

**Drifting readings**

**Erratic/drifting readings or display reads**

**– on left hand side when calibration plug**

**is attached**

### Probable Cause(s)

- **Battery is flat or not installed**

- **Battery is low**

- **Cell disconnected**

- **Cell not immersed in solution**

- **Cell in non-ionic solution**

- **Cell is open circuit**

- **Wrong range selected**

- **Solution outside range of instrument  
(>200mS/cm)**

- **Sample temperature changing**

- **Cell contaminated.**

- **Return meter for servicing**

In the event of a malfunction, it is important to pinpoint the problem to either the meter or the cell. If a spare cell is available, substitute it for the one in use.

**There are no user serviceable parts in this instrument. Please ensure that the instrument, together with all accessories, is returned to OMEGA Engineering Inc. with a full description of the symptoms of the fault. No attempt should be made to repair the meter.**



# SECTION 4

## Accessories

### Available From OMEGA Engineering Inc.

All cells listed have automatic temperature compensation (ATC). Standard lead length is 1 meter. Other lead lengths can be made to order.

Part No	Description	Measurement	Cell	Application
<b>Dip Type Cells</b>				
CDE-5001-GD1	Glass Dip K=1/cm	100 $\mu$ S-100mS	platinum plates	general
CDE-5002-ED1	Polymer Dip K=1/cm	100 $\mu$ S-100mS	platinum plates	general
CDE-5004-ED10	Epoxy Dip K=10/cm	100mS-2000mS	graphite plates	industrial &field
CDE-5010-ED1	Epoxy Dip K=1/cm	100 $\mu$ S-100mS	graphite plates	industrial &field
CDE-5011-ED01	EpoxyDip K=0.1/cm	0.01 $\mu$ S-200mS	graphite plates	industrial &field
CDE-5014-GD01	Glass Dip K=0.1/cm	0.01 $\mu$ S-100 $\mu$ S	platinum plates	pure water
CDE-5019-ED1	Epoxy Dip K=1/cm	100 $\mu$ S-100mS	graphite plates	industrial &field
<b>Sample Cells</b>				
CDE-5015-GS01	Glass sample K=0.1/cm	0.01 $\mu$ S-100 $\mu$ S	platinum plates	pure water
<b>Flow Cells</b>				
CDE-5005-GF1	Glass Flow K=1/cm	100 $\mu$ S-100mS	platinum plates	lab use
CDE-5008-EF10	Epoxy Flow K=10/cm	100mS-2000mS	graphite plates	industrial flowline
CDE-5012-EF1	Epoxy Flow K=1/cm	100 $\mu$ S-100mS	graphite plates	industrial flowline
CDE-5013-ED01	Epoxy Flow K=0.1/cm	0.01 $\mu$ S-200mS	graphite plates	industrial flowline

# SECTION 5

## Specifications

<b>Conductivity</b>	<b>Ranges ( resolution):</b>	0 - 200 $\mu$ S/ cm (0.1) 0 - 2mS/cm (1) 0 - 20 mS/cm (10) 0 - 200mS/cm (100)
	<b>Accuracy:</b>	$\pm 0.5\%$ of reading
<b>Temperature Compensation:</b>		0 - 50°C
<b>Reference Temperature:</b>		25°C
<b>Temperature Coefficient:</b>		2%/°C
<b>Power:</b>		9V battery
<b>Instrument size:</b>		5.7" x 3.15" x 1.52"
<b>Instrument weight:</b>		0.6lb

# Appendix 1

## Cell Constants

Conductivity cells with different cell constants can be used to achieve greater accuracy, or used to make difficult measurements easier. Selection of the correct cell constant is dependent on the conductivity range of your sample. Conductivities of various waters and common solutions, together with the most suitable cell constants are given below.

**K = 0.1/cm (K = 10.0/m)**

For measurements of solutions with very low conductivity. e.g. pure water, de-mineralized water, distilled water, boiler feed water.

**K = 1.0/cm (K= 100/m)**

For measurements of solutions with medium conductivity, e.g. surface water, waste water, diluted salt solutions, fertilizers, electroplating rinses.

**K = 10/cm (K=1000/m)**

For measurements of solutions with high conductivity, e.g. strong acid, strong alkali, strong salt solutions, sea water.

In order to obtain the absolute conductivity value, multiply the displayed reading by the cell constant.

### Cell Conversion Table

c.g.s units	SI units
<b>K =1.0/cm</b>	<b>K = 100.0/m</b>
<b>K = 0.1/cm</b>	<b>K = 10.0/m</b>
<b>K = 10.0/cm</b>	<b>K =1000/m</b>

# Appendix 2

## Calibration Solutions

1413 $\mu$ S/cm @ 25°C 0.01M KCl

°C	$\mu$ S/cm	mS/m	°C	$\mu$ S/cm	mS/m
5	896	89.6	25	1413	141.3
10	1020	102.0	26	1441	144.1
15	1147	114.7	27	1468	146.8
16	1173	117.3	28	1496	149.6
17	1199	119.9	29	1524	152.4
18	1225	122.5	30	1552	155.2
19	1251	125.1	31	1581	158.1
20	1278	127.8	32	1609	160.9
21	1305	130.5	33	1638	163.8
22	1332	133.2	34	1667	166.7
23	1359	135.9	35	-	-
24	1386	138.6	36	-	-

12.88mS/cm @ 25°C 0.1M KCl

°C	$\mu$ S/cm	mS/m	°C	$\mu$ S/cm	mS/m
5	896	89.6	25	1413	141.3
10	1020	102.0	26	1441	144.1
15	1147	114.7	27	1468	146.8
16	1173	117.3	28	1496	149.6
17	1199	119.9	29	1524	152.4
18	1225	122.5	30	1552	155.2
19	1251	125.1	31	1581	158.1
20	1278	127.8	32	1609	160.9
21	1305	130.5	33	1638	163.8
22	1332	133.2	34	1667	166.7
23	1359	135.9	35	-	-
24	1386	138.6	36	-	-

## Calibration Solutions

2.765 mS/cm @ 25°C 0.02M KCl

°C	mS/cm	mS/m	°C	mS/cm	mS/m
5	1.752	175.2	25	2.765	276.5
10	1.994	199.4	26	2.819	281.9
15	2.243	224.3	27	2.873	287.3
16	2.294	229.4	28	2.927	292.7
17	2.345	234.5	29	2.981	298.1
18	2.397	239.7	30	3.036	303.6
19	2.449	244.9	31	3.091	309.1
20	2.501	250.1	32	3.146	314.6
21	2.553	255.3	33	3.201	320.1
22	2.606	260.6	34	3.256	325.6
23	2.659	265.9	35	3.312	331.2
24	2.712	271.2	36	3.368	336.8

111.8mS/cm @ 25°C 1.0 M KCl

°C	mS/cm	S/m	°C	mS/cm	S/m
5	74.14	7.414	25	111.80	11.180
10	83.19	8.319	26	113.77	11.377
15	92.52	9.252	27	115.74	11.574
16	94.41	9.441	28	-	-
17	96.31	9.631	29	-	-
18	98.22	9.822	30	-	-
19	100.01	10.014	31	-	-
20	102.07	10.207	32	-	-
21	104.00	10.400	33	-	-
22	105.54	10.554	34	-	-
23	107.89	10.789	35	-	-
24	109.84	10.984	36	-	-

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# Notes

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## WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

**OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.**

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## RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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